

DRY DOCK ON THE COLUMBIA RIVER, OREGON.

LETTER

FROM

THE SECRETARY OF THE NAVY,

TRANSMITTING

A REPORT OF THE BOARD OF NAVAL OFFICERS ON THE DESIRABILITY OF LOCATING A DRY DOCK ON THE COLUMBIA RIVER, OREGON.

JANUARY 3, 1901.—Referred to the Committee on Naval Affairs and ordered to be printed.

NAVY DEPARTMENT,
Washington, January 2, 1901.

SIR: Pursuant to the following provision contained in the naval appropriation act, approved June 7, 1900, namely:

And the Secretary of the Navy is hereby authorized and directed to appoint a board of naval officers to determine the desirability of locating and constructing a dry dock on the Columbia River, Oregon, and to report such finding to the next session of the present Congress; and the sum of one thousand dollars, or so much thereof as may be necessary, is hereby appropriated to defray the expenses of said board,

a board, consisting of Capt. Henry Glass, U. S. N., senior member, and Lieut. Philip Andrews, U. S. N., and Civil Engineer Homer R. Stanford, U. S. N., members, was appointed by the Department with a view to carrying into effect the provision above cited.

A copy of the report of this board, with accompanying papers, is herewith forwarded in accordance with the direction contained in the act referred to.

Very respectfully,

JOHN D. LONG,
Secretary.

THE PRESIDENT PRO TEMPORE UNITED STATES SENATE.

UNITED STATES NAVAL TRAINING STATION,
YERBA BUENA ISLAND,
San Francisco, Cal., July 23, 1900.

The board of naval officers appointed pursuant to a provision contained in the "act making appropriations for the naval service for the

fiscal year ending June 30, 1901," approved June 7, 1900 (Public—No. 195, pp. 13, 14), has the honor to submit herewith its report, accompanied by appendixes and maps illustrative of the major features of the mouth of the Columbia River, Oregon.

At the call of the senior member the board met and organized in the commandant's office at this station July 9, 1900. In accordance with telegrams, copies of which are appended, marked "A" and "B," Lieut. Philip Andrews was made a member of the board, vice Lieut. Allen G. Rogers, relieved. After reading the precepts convening the board and letter of instructions from the Chief of the Bureau of Yards and Docks, copies of which are appended, marked "C" and "D," the board adjourned to assemble July 12, 1900, for passage on the steamship *State of California* to Portland, Oreg. During the period intervening the board secured from the army engineers' office in San Francisco information regarding the location of officers in charge of Columbia River improvements, and also provided themselves with charts showing the Columbia River from its mouth to Portland.

Sailing from San Francisco the morning of July 12, 1900, the entrance to the Columbia River was sighted about 9 a. m. July 14, and under the most favorable conditions of sea and weather, and from the vantage point of the ship's bridge, an excellent idea and understanding was obtained of the buoys, jetty, coast line, and channel leading to Astoria. After a two hours' stop at Astoria, the ship continued on her way up the river at 2.30 p. m., and Portland was reached at 8.30 p. m. July 14, 1900.

July 16 the board passed in Portland, securing data from the offices of the army engineers, weather bureau, and citizens.

July 17 the board spent the day in Astoria, getting data from the life-saving station and various other sources and in making a general observation of the harbor and of the topographical features in the neighborhood of Astoria, using a steam launch secured by the Astoria Chamber of Commerce for the purpose; returned to Portland by the evening train.

July 18 the board made a general inspection of the Columbia River from Portland up to the Cascades, paying more particular attention to the waters of the Willamette River from Portland to its mouth and to the Columbia River in the vicinity of its junction with the Willamette.

July 19 the board completed the collection of data considered necessary, and took the evening train for San Francisco, arriving there early Saturday morning, July 21, and adjourned to meet July 23 at the Naval Training Station, San Francisco.

The board reassembled on July 23, and after a careful consideration of all the data obtainable submits the following summary:

ADVANTAGES.

Location and strategic position.—The mouth of the Columbia River is one of four points on the Pacific coast of the United States which affords safe harbor for moderate draft shipping. It is the natural outlet for an immense productive territory, and as a shipping point is important because of its excellent through railroad communications.

Its position, 550 miles from San Francisco, and the only available point between San Francisco and Puget Sound, makes it highly impor-

tant, from a strategic standpoint, to have the Columbia River possible as a harbor of refuge and repair for naval vessels, more especially as the entrance to the Puget Sound naval station lies between shores, one of which belongs to another nation.

Defenses.—The mouth of the Columbia, with the modern defenses established and appropriated for, is amply defended against any possible hostile force.

Fresh water.—The Columbia River, from a point about 15 miles above its mouth, is always fresh. Numerous mountain streams make available an abundant supply of potable water anywhere on the river.

Railroad.—Ample railroad communication is found in a railroad on the south or left bank of the Columbia to the mouth of the river, near and beyond Astoria. By this railroad supplies can be received from all the great railroads leading in to Portland.

Labor and supplies.—Portland, the largest city in the extreme Northwest, is convenient to all points on the Columbia River, and is an excellent labor and supply center.

Climate.—The climate of the Columbia River is mild, with but little snow, and work at a shipyard could proceed without interruption throughout the year.

DISADVANTAGES.

Columbia River Bar.—In considering the advisability of establishing a dry dock on the Columbia River the depth of water on the river bar must always be the leading consideration.

The ruling depth of the bar channel, previous to the construction of the jetty, was from 20 to 21 feet. The jetty was commenced in 1885 and completed in 1895, when a depth of 31 feet was secured in the main ship channel at low water, 30 feet having been expected.

The survey of 1896 showed a shoaling to a 30-foot channel; that of 1897 showed no change, while in 1898 the depth had decreased to 29 feet, and in 1899 to 28 feet. For these four years the decrease in depth may be said to have been fairly uniform, but last winter, during the nine months from September, 1899, to June, 1900, the bar has shoaled from 28 to 23 feet, a decrease in depth of 5 feet.

A plan has been prepared and approved by the War Department for a continuation of jetty work, with the expectation of obtaining a 40-foot channel. For this purpose an appropriation has been granted to make preparations for the proposed jetty extension, thus probably insuring the whole appropriation necessary for the complete improvement of the bar. With this work accomplished the army engineers expect that at least 35 feet, and probably 40 feet, will be secured.

It is also proposed to secure a depth of 25 feet at low water in the channel of the river from a point immediately above Astoria to Portland. The most serious difficulty existing at present is the shoalness of the channel from Tongue Point to Point Harrington on the north shore, a depth of 17 feet only at mean low water being shown in some spots. This must be remedied before the river can be considered open at all times to vessels of deep draft.

Crossing bar.—With or after a southeast or southwest gale, the Columbia River bar is very rough and practically not navigable. Under these conditions, vessels are bar bound often for a considerable time. (See Appendix E.)

According to numerous authorities, from 10 to 12 feet are needed under the keel of a moderate draft vessel in very rough weather. Last winter ships drawing 17 feet coming in are reported to have touched during rough weather; for ships drawing 22 feet or over, exceptionally favorable conditions of weather, tide, and bar are necessary.

Annual freshets.—From the mouth of the Columbia River to just above Astoria the yearly freshets produce no effect on the height of the tide, while from this point to the mouth of the Willamette the variation in height of water from this cause is from zero to 15 feet.

The average range of tide in the vicinity of Astoria is between 7 and 8 feet.

Weather and bar conditions.—For the general conditions of wind and weather and state of the bar reference may be made to Appendix F, a table covering these points for a period of about eighteen months.

CONCLUSION.

In view of the above the board is unanimously of the opinion that while the present conditions exist the benefit to be derived by the naval service would not warrant the expense of locating a dry dock and the naval station which would result, and maintaining the same.

Should the proposed improvements of the bar and river channel be carried out, and result in obtaining the necessary depth of water, which seems assured from past experience, the board is of the opinion that the location on the Columbia of a dry dock and naval station for making repairs to modern vessels of war would be most desirable, from the undoubted advantages possessed by the river.

Not being able to report that the location of a dry dock on the river is advisable at this time, the board did not select any location, but is of the opinion that a desirable site could be obtained, without undue expense to the Government, that would meet the requirements noted in the instructions of the Bureau of Yards and Docks.

Very respectfully,

HENRY GLASS,
Captain, U. S. N., Senior Member.

PHILIP ANDREWS,
Lieutenant, U. S. N., Member.

HOMER R. STANFORD,
Civil Engineer, U. S. N., Member.

The SECRETARY OF THE NAVY,
Navy Department, Washington, D. C.

LIST OF APPENDIXES.

- A.—Telegram appointing Lieutenant Andrews member of board.
- B.—Telegram substituting Lieutenant Andrews for Lieutenant Rogers.
- C.—Order of Navy Department appointing board.
- D.—Instructions from Bureau of Yards and Docks.
- E.—Table showing detention of vessels at mouth of Columbia River, due to state of bar.
- F.—Table showing state of Columbia River bar, with wind and weather.
- G.—Table showing number of days with gales at mouth of river.
- H.—Table showing number of days with fog at mouth of river.
- J.—Table showing ships of heavy draft sailing from Portland, Oreg., for nine months ending June 30, with their draft.

- K.—Pamphlet report on improvement of Columbia River bar, dated (Secretary of War) December 4, 1899.
 L.—Pamphlet report on survey and improvement of Lower Willamette and Columbia rivers, dated (Secretary of War) May 7, 1900.
 M.—Blue print showing soundings on Columbia River bar in September, 1899.
 N.—Blue print showing soundings on bar in June, 1900.
 O.—Blue print showing soundings from Astoria to Three Tree Point, on Columbia River.

EXHIBIT A.

WASHINGTON, D. C., July 7, 1900—10.08 a. m.

Capt. HENRY GLASS,
Yerba Buena Island, San Francisco, Cal.:

Lieut. Philip Andrews hereby appointed member board of which you are president, vice Rogers, relieved.

HACKETT, *Acting.*

EXHIBIT B.

WASHINGTON, D. C., July 7, 1900—1.34 p. m.

COMMANDANT NAVAL TRAINING STATION,
San Francisco, Cal.

Lieutenant Andrews will be substituted on Columbia River dock board instead of Lieutenant Rogers, as requested. Orders mailed to-day.

CROWNINSHIELD.

EXHIBIT C.

NAVY DEPARTMENT, *Washington, June 30, 1900.*

SIR: In pursuance of a provision contained in the "act making appropriations for the naval service for the fiscal year ending June 30, 1901," approved June 7, 1900 (Public—No. 195, pp. 13, 14, copy inclosed), a board is hereby constituted for the purpose of determining the desirability of locating and constructing a dry dock on the Columbia River, Oregon.

The board will consist of yourself as president, and of Lieut. Allen G. Rogers and Civil Engineer Homer R. Stanford, United States Navy, as additional members, the junior member acting as recorder.

The board will assemble at the naval training station, Yerba Buena Island, California, at such time as may be designated by its president, and thence, after organization in the usual manner, will proceed to Portland, Ore., in the discharge of the duty for which it is convened. Specific instructions respecting the details of such duty will be furnished by the Chief of the Bureau of Yards and Docks.

The board will visit such points on the Columbia River, Oregon, as may be deemed advisable and necessary in order to reach a determination upon the matters with which it is charged, and on the completion of its investigations will, without delay, report to the Department its conclusions.

Individual orders to proceed to Portland and return will be issued to the several members of the board by the Bureau of Navigation, and such further orders for travel as may be necessary will be issued by the president of the board, and subsequently submitted through such Bureau for the Department's approval.

The sum of \$1,000, or so much thereof as may be necessary, appropriated by the act above mentioned, is available for the expenses of the board, but must not be drawn upon for subsistence, which is covered by mileage, nor for travel, unless the board should find it necessary to charter a tug, or other like vessel, in prosecuting the examinations necessary in making the preliminary surveys requisite to the discharge of its duties.

This employment on shore duty is required by the public interests.

Very respectfully,

JOHN D. LONG, *Secretary.*

Capt. HENRY GLASS, U. S. N.,
Commandant Naval Training Station, Yerba Buena Island, San Francisco, Cal.

EXHIBIT D.

DEPARTMENT OF THE NAVY, BUREAU OF YARDS AND DOCKS,
Washington, D. C., June 29, 1900.

SIR: As president of a board to determine the desirability of locating and constructing a dry dock on the Columbia River, Oregon, the following instructions are issued to you for the information and guidance of the board. The clause of the naval appropriation act providing for such examination is as follows:

"And the Secretary of the Navy is hereby authorized and directed to appoint a board of naval officers to determine the desirability of locating and constructing a dry dock on the Columbia River, Oregon, and to report such finding to the next session of the present Congress; and the sum of one thousand dollars, or so much thereof as may be necessary, is hereby appropriated to defray the expenses of said board."

2. The board will first consider whether it is desirable to locate a dry dock for naval purposes upon the Columbia River, Oregon. In arriving at a conclusion upon this question it will study the matter of the probable value to the service from all standpoints which suggest themselves, giving particular attention to that of its strategic value and whether it would be sufficient to warrant the necessary expenditures for the land and dry dock and the establishment and maintenance of the naval station which would result.

3. If the board should find the establishment of a dry dock upon the river named desirable, it will make a careful study of such points as appear to be advantageous for the purpose, and, having selected the site which in its opinion is most suitable, it will estimate the value and ascertain the price for which the lands, if private, can be purchased, making full report to the Secretary of the Navy of its proceedings and action.

4. In the discharge of this duty the following features considered desirable are called especially to the attention of the board:

- (a) A harbor of sufficient size and depth and easily accessible for the largest vessels of the Navy.
- (b) A position which is advantageously located with reference to the lines of defense.
- (c) Sufficient water frontage of ample depth.
- (d) A position well located with relation to lines of railroad or other communication with the principal sources of supply.
- (e) Good foundations for the construction of a dry dock and other public works pertaining to a naval station.
- (f) Facilities for furnishing labor and supplies of materials promptly, and the conveniences for obtaining the former in considerable quantity for temporary use.
- (g) A location affording an ample supply of good water.

5. You are directed to put yourself into communication with the Chief of Engineers of the Army, or his local representative at Portland, for the purpose of ascertaining the lines of defense constructed or formulated, the present condition of the entrance to the harbor, and the plans for any future improvement of the latter which are in progress or formulated.

6. The board will please give to this matter its careful study, both with respect to the desirability of constructing a dry dock in those waters and, such desirability being established in the minds of the board, the location most suitable and desirable.

7. The board will report the probable cost of the site it shall recommend.

Very respectfully,

MORDECAI T. ENDICOTT,
Chief of Bureau.

Capt. HENRY GLASS, U. S. N.,
President of Board on Dry Dock on Columbia River, Oregon.

EXHIBIT E.

Detention of vessels at the bar at the mouth of the Columbia River from July, 1895, to June, 1899.

[Outward bound only.]

Date.	Number of vessels passed out.	Total tonnage.	Draft.		Number of vessels delayed.	Total days detention for all detained vessels.
			Maximum.	Minimum.		
1895.						
July.....	3	3,991	<i>Fect.</i> 22.5	<i>Fect.</i> 15.5	.....	.....
August.....	5	7,526	22.5	19.5	3	5
September.....	4	5,050	22.5	17.0	.....	.....
October.....	14	22,192	22.5	17.5	1	2
November.....	9	15,771	23.5	19.0	.....	.....
December.....	11	17,531	23.0	14.0	6	27
1896.						
January.....	16	24,178	22.5	20.0	15	102
February.....	8	12,112	23.0	18.5	3	20
March.....	5	7,279	22.0	20.0	.....	.....
April.....	7	10,080	22.0	12.5	.....	.....
May.....	4	5,198	22.0	17.0	.....	.....
June.....	6	9,312	22.5	12.5	.....	.....
July.....	4	7,175	22.5	21.5	.....	.....
August.....	6	6,924	21.0	15.0	.....	.....
September.....	9	14,436	24.0	12.5	.....	.....
October.....	17	24,460	22.5	16.0	.....	.....
November.....	23	36,075	23.0	17.5	10	55
December.....	20	32,014	24.0	17.5	6	22
1897.						
January.....	11	15,621	24.0	12.5	1	3
February.....	6	8,931	24.0	20.0	2	9
March.....	5	7,443	24.5	12.0	.....	.....
April.....	1	1,870	21.5	21.5	.....	.....
May.....	3	3,902	21.5	19.0	.....	.....
June.....	2	3,018	21.5	19.0	.....	.....
July.....	4	5,556	22.0	15.5	.....	.....
August.....	2	4,300	22.5	22.0	.....	.....
September.....	11	18,691	24.5	19.0	.....	.....
October.....	17	29,648	24.0	16.5	4	14
November.....	25	44,204	25.5	16.0	11	48
December.....	16	28,504	25.0	19.0	14	93
1898.						
January.....	22	37,758	25.5	18.0	10	55
February.....	14	24,634	23.5	20.0	10	80
March.....	19	34,156	24.5	15.0	10	39
April.....	14	25,286	23.0	20.5	6	22
May.....	10	17,086	23.5	18.5	.....	.....
June.....	8	14,785	23.5	20.5	.....	.....
July.....	9	16,183	23.5	20.0	1	2
August.....	3	4,733	24.5	18.5	1	3
September.....	1	1,250	12.0	12.0	.....	.....
October.....	26	41,809	23.5	17.0	10	73
November.....	13	21,960	22.0	20.0	10	62
December.....	20	35,522	24.0	20.0	14	111
1899.						
January.....	16	23,743	23.0	17.0	16	218
February.....	10	17,207	23.0	15.5	2	9
March.....	18	28,126	23.5	16.0	4	9
April.....	6	8,173	23.5	17.0	2	6
May.....	8	14,399	24.0	17.5	2	35
June.....	5	8,135	23.5	19.0	.....	.....

EXHIBIT F.

Statement showing the condition of the bar at the mouth of the Columbia River at 8 a. m., one hundred and twentieth meridian time, from January 5, 1899, to July 16, 1900, inclusive.

Date.	Condition of bar.	Barom-eter.	Wind.	Force.	Weather.
1899.					
Jan. 5	Smooth.....	30.26	East.....	14 miles..	Snowing.
6	do.....	30.14	do.....	20 miles..	Cloudy.
7	Moderate, heavy swell.....	30.16	do.....	10 miles..	Do.
9	Rough.....	29.54	do.....	30 miles..	Raining.
10	Moderate.....	29.32	South.....	20 miles..	Cloudy.
11	Rough.....	29.54	Southeast.....	4 miles..	Do.
12	do.....	30.00	East.....	16 miles..	Do.
13	No report, line down.				
14	Rough.....	29.82	South.....	4 miles..	Do.
16	do.....	30.12	Southeast.....	24 miles..	Raining.
17	Moderate.....	30.04	do.....	32 miles..	Cloudy.
18	Rough.....	30.12	South.....	10 miles..	Do.
19	Moderate.....	30.10	Southeast.....	40 miles..	Do.
20	Rough.....	30.14	South.....	44 miles..	Raining.
21	No report.				
23	Moderate.....	30.00	Southeast.....	26 miles..	Cloudy.
24	do.....	30.48	do.....	14 miles..	Raining.
25	Obscured.....	30.48	Southwest.....	22 miles..	Dense fog.
26	do.....	30.48	Southeast.....	6 miles..	Do.
27	do.....	30.46	do.....	2 miles..	Do.
28	do.....	30.42	South.....	2 miles..	Do.
30	do.....	30.26	West.....	do.....	Do.
31	Rough.....	29.18	do.....	22 miles..	Raining.
Feb. 1	do.....	29.54	East.....	24 miles..	Cloudy.
2	No report.				
3	Smooth.....	30.20	do.....	12 miles..	Clear.
4	do.....	30.36	do.....	10 miles..	Cloudy.
6	do.....	30.46	do.....	6 miles..	Do.
7	No report, line down.				
8	No report, line down.				
9	Obscured.....	30.02	South.....	26 miles..	Raining.
10	Rough.....	30.32	East.....	4 miles..	Cloudy.
11	Smooth.....	30.20	do.....	16 miles..	Do.
13	Obscured.....	30.30	South.....	10 miles..	Dense fog.
14	Rough.....	30.06	Southeast.....	48 miles..	Raining.
15	do.....	30.34	West.....	8 miles..	Cloudy.
16	do.....	30.42	do.....	16 miles..	Raining.
17	No report, line down.				
18	Obscured.....	30.50	South.....	14 miles..	Dense fog.
20	Rough.....	30.40	West.....	10 miles..	Cloudy.
21	do.....	30.24	Northwest.....	12 miles..	Do.
23	Moderate.....	29.86	do.....	8 miles..	Do.
24	do.....	30.06	do.....	12 miles..	Do.
25	Rough.....	29.96	do.....	10 miles..	Do.
27	do.....	30.00	do.....	6 miles..	Do.
28	No report, line down.				
Mar. 1	Rough.....	29.68	Southwest.....	8 miles..	Raining.
2	do.....	29.80	do.....	do.....	Cloudy.
3	Moderate.....	30.26	do.....	6 miles..	Clear.
4	do.....	30.26	do.....	do.....	Do.
6	Smooth.....	30.06	Southeast.....	24 miles..	Cloudy.
7	No report, line down.				
8	No report, line down.				
9	Moderate.....	30.16	North.....	4 miles..	Clear.
10	Smooth.....	30.28	Southeast.....	18 miles..	Raining.
11	Moderate.....	30.14	West.....	4 miles..	Cloudy.
13	No report, line down.				
14	No report, line down.				
15	Smooth.....	29.74	North.....	12 miles..	Partly cloudy.
16	No report, line down.				
17	Smooth.....	30.00	South.....	4 miles..	Cloudy.
18	do.....	30.20	Southeast.....	10 miles..	Do.
20	do.....	29.70	West.....	4 miles..	Do.
21	do.....	29.90	do.....	do.....	Do.
22	do.....	30.00	Southeast.....	12 miles..	Do.
23	do.....	29.84	East.....	4 miles..	Do.
24	Moderate.....	29.98	North.....	6 miles..	Do.
25	Smooth.....	30.22	do.....	4 miles..	Clear.
27	do.....	30.18	do.....	do.....	Cloudy.
28	No report, line down.				
29	Smooth.....	29.94	Northwest.....	8 miles..	Do.
30	do.....	30.06	Southeast.....	do.....	Do.
31	do.....	30.00	North.....	4 miles..	Do.
Apr. 1	do.....	29.98	Southeast.....	12 miles..	Do.
3	Moderate.....	30.04	Northwest.....	4 miles..	Do.

EXHIBIT F.—Statement showing the condition of the bar at the mouth of the Columbia River at 8 a. m., one hundred and twentieth meridian time, etc.—Continued.

Date.	Condition of bar.	Barometer.	Wind.	Force.	Weather.
1899.					
Apr. 4	Rough.....	30.42	East.....	4 miles....	Cloudy.
5	Smooth.....	30.10	.....do.....	12 miles....	Do.
6	.....do.....	30.50	.....do.....	2 miles....	Do.
7	.....do.....	30.22	North.....	.....do.....	Clear.
8	Moderate.....	30.00	Southeast.....	6 miles....	Cloudy.
10	Rough.....	29.96	West.....	.....do.....	Do.
11	No report.				
12	Rough.....	30.08	Northwest.....	14 miles....	Do.
13	Moderate.....	30.28	East.....	.....do.....	Do.
14	.....do.....	30.30	Southeast.....	8 miles....	Clear.
15	.....do.....	30.02	East.....	12 miles....	
17	Rough.....	29.94	.....do.....	22 miles....	Raining.
18	.....do.....	29.86	Southwest.....	10 miles....	Cloudy.
19	.....do.....	30.32	Southeast.....	16 miles....	Do.
20	Smooth.....	30.20	.....do.....	12 miles....	Do.
21	Rough.....	30.32	Northwest.....	8 miles....	Do.
22	Smooth.....	30.24	North.....	.....do.....	Clear.
24	Moderate.....	29.78	.....do.....	12 miles....	Cloudy.
25	Rough.....	29.94	Southeast.....	24 miles....	Do.
26	.....do.....	29.82	Northwest.....	10 miles....	Do.
27	.....do.....	29.84	West.....	.....do.....	Raining.
28	.....do.....	30.24	Northwest.....	.....do.....	Partly cloudy.
29	.....do.....	30.10	South.....	.....do.....	Raining.
May 1	.....do.....	30.06	Northwest.....	18 miles....	Cloudy.
2	No report.				
3	Smooth.....	30.18	East.....	14 miles....	Do.
4	Moderate.....	30.00	South.....	24 miles....	Do.
5	Smooth.....	30.02	Northwest.....	8 miles....	Do.
6	Moderate.....	30.24	North.....	6 miles....	Do.
8	Obscured.....	30.12	South.....	36 miles....	Raining.
9	Moderate.....	30.26	North.....	4 miles....	Do.
10	.....do.....	30.08	Southeast.....	22 miles....	Cloudy.
11	Rough.....	30.28	West.....	14 miles....	Do.
12	Moderate.....	30.36	Northwest.....	6 miles....	Clear.
13	.....do.....	30.16	North.....	8 miles....	Cloudy.
15	Smooth.....	30.22	Northwest.....	6 miles....	Do.
16	Moderate.....	29.96	West.....	10 miles....	Do.
17	Smooth.....	30.08	Southeast.....	4 miles....	Do.
18	.....do.....	30.18	Northwest.....	10 miles....	Do.
19	.....do.....	30.16	.....do.....	.....do.....	Do.
20	.....do.....	30.22	.....do.....	6 miles....	Do.
22	.....do.....	29.92	Southwest.....	2 miles....	Do.
23	.....do.....	30.02	Northwest.....	.....do.....	Do.
24	.....do.....	30.00	.....do.....	.....do.....	Do.
25	.....do.....	29.98	West.....	.....do.....	Raining.
26	.....do.....	30.08	Southeast.....	12 miles....	Cloudy.
27	Rough.....	30.06	Northwest.....	2 miles....	Clear.
29	Moderate.....	29.94	.....do.....	8 miles....	Cloudy.
31	Rough.....	29.52	Southeast.....	24 miles....	Raining.
June 1	.....do.....	29.80	West.....	14 miles....	Do.
2	Smooth.....	30.16	Northwest.....	4 miles....	Cloudy.
3	.....do.....	30.20	.....do.....	8 miles....	Do.
5	Rough.....	30.10	.....do.....	14 miles....	Do.
6	Smooth.....	30.20	.....do.....	6 miles....	Do.
7	.....do.....	30.26	North.....	4 miles....	Clear.
8	.....do.....	30.32	.....do.....	8 miles....	Cloudy.
9	.....do.....	30.24	.....do.....	4 miles....	Do.
10	Obscured.....	30.08	Southeast.....	14 miles....	Raining and dense fog.
12	Moderate.....	30.06	West.....	10 miles....	Cloudy.
13	.....do.....	30.24	Southeast.....	8 miles....	Do.
14	Smooth.....	30.27	West.....	7 miles....	Do.
15	Moderate.....	30.34	North.....	6 miles....	Partly cloudy.
16	Smooth.....	30.26	.....do.....	12 miles....	Cloudy.
17	.....do.....	30.28	Northeast.....	8 miles....	Clear.
19	.....do.....	30.00	Northwest.....	6 miles....	Cloudy.
20	.....do.....	30.34	West.....	5 miles....	Do.
21	.....do.....	30.40	North.....	9 miles....	Partly cloudy.
22	Obscured.....	30.22	.....do.....	4 miles....	Dense fog.
23	Smooth.....	30.10	Southeast.....	5 miles....	Cloudy.
26	.....do.....	29.92	Southwest.....	25 miles....	Do.
27	.....do.....	30.20	Southeast.....	10 miles....	Do.
28	.....do.....	30.14	North.....	5 miles....	Do.
29	.....do.....	30.30	Northeast.....	3 miles....	Partly cloudy
30	.....do.....	30.40	North.....	12 miles....	Clear.
July 1	.....do.....	30.20	.....do.....	10 miles....	Do.
3	.....do.....	30.14	Northwest.....	9 miles....	Raining.
5	.....do.....	30.10	.....do.....	5 miles....	Cloudy.
6	.....do.....	30.08	.....do.....	2 miles....	Do.
7	.....do.....	30.10	Southeast.....	8 miles....	Do.

EXHIBIT F.—Statement showing the condition of the bar at the mouth of the Columbia River at 8 a. m., one hundred and twentieth meridian time, etc.—Continued.

Date.	Condition of bar.	Barom-eter.	Wind.	Force.	Weather.
1899.					
July 8	Smooth.....	30.18	Southeast....	8 miles...	Clear.
10	do.....	30.20	North.....	6 miles...	Do.
11	do.....	30.10	Northeast...	2 miles...	Do.
12	do.....	30.16	North.....	10 miles...	Cloudy.
13	do.....	30.20	do.....	8 miles...	Do.
14	do.....	30.04	do.....	6 miles...	Do.
15	do.....	29.98	Northwest...	3 miles...	Do.
17	do.....	30.19	North.....	5 miles...	Do.
18	do.....	30.24	do.....	do.....	Do.
19	do.....	30.18	do.....	4 miles...	Do.
20	do.....	30.06	do.....	8 miles...	Do.
21	do.....	30.04	Southeast....	5 miles...	Do.
22	do.....	30.26	Northwest...	7 miles...	Do.
24	Moderate.....	30.09	North.....	6 miles...	Do.
25	do.....	30.00	do.....	3 miles...	Clear.
26	Obscured.....	29.99	Southeast....	6 miles...	Dense fog.
27	do.....	29.99	do.....	4 miles...	Do.
28	Smooth.....	29.96	Northwest...	do.....	Cloudy.
29	do.....	29.99	South.....	10 miles...	Do.
31	do.....	30.05	Southeast....	12 miles...	Do.
Aug. 1	do.....	30.04	North.....	2 miles...	Partly cloudy.
2	do.....	30.12	do.....	7 miles...	Cloudy.
3	do.....	30.11	do.....	8 miles...	Do.
4	do.....	30.02	West.....	5 miles...	Do.
5	do.....	30.04	North.....	3 miles...	Do.
7	do.....	30.02	do.....	2 miles...	Do.
8	Moderate.....	29.98	do.....	do.....	Do.
9	Rough.....	29.79	Southwest...	10 miles...	Do.
10	Moderate.....	30.06	North.....	5 miles...	Do.
11	Smooth.....	30.10	do.....	8 miles...	Clear.
12	do.....	29.94	do.....	3 miles...	Cloudy.
14	do.....	29.94	South.....	18 miles...	Do.
15	do.....	30.10	West.....	2 miles...	Do.
16	Moderate.....	29.92	Southeast....	26 miles...	Raining.
17	Rough.....	29.92	North.....	do.....	Clear.
18	Moderate.....	30.00	do.....	3 miles...	Light rain.
19	do.....	30.08	Northwest...	do.....	Cloudy.
21	do.....	30.00	West.....	8 miles...	Do.
22	Rough.....	30.14	do.....	3 miles...	Do.
23	Moderate.....	30.24	do.....	10 miles...	Do.
24	Smooth.....	30.10	North.....	5 miles...	Do.
25	do.....	30.00	Northwest...	do.....	Do.
26	do.....	29.88	Southeast....	2 miles...	Do.
28	do.....	30.25	North.....	8 miles...	Clear.
29	do.....	30.25	do.....	do.....	Cloudy.
30	do.....	30.02	do.....	do.....	Clear.
31	do.....	29.78	Northwest...	8 miles...	Cloudy.
Sept. 1	do.....	29.96	Southeast....	12 miles...	Do.
2	do.....	29.91	do.....	10 miles...	Do.
4	No report.				
5	Smooth.....	29.98	do.....	8 miles...	Do.
6	do.....	30.28	do.....	10 miles...	Clear.
7	do.....	30.26	North.....	2 miles...	Do.
8	do.....	30.18	do.....	5 miles...	Do.
9	Moderate.....	30.15	East.....	7 miles...	Cloudy.
11	do.....	30.07	North.....	3 miles...	Clear.
12	Smooth.....	30.14	do.....	5 miles...	Cloudy.
13	Rough.....	30.22	do.....	2 miles...	Do.
14	Smooth.....	30.20	North.....	6 miles...	Clear.
15	Obscured.....	30.08	do.....	3 miles...	Dense fog.
16	do.....	30.08	do.....	do.....	Do.
18	Smooth.....	30.10	do.....	5 miles...	Clear.
19	Obscured.....	30.12	South.....	6 miles...	Dense fog.
20	Smooth.....	30.22	Northwest...	5 miles...	Cloudy.
21	do.....	30.25	North.....	do.....	Do.
22	do.....	30.26	do.....	do.....	Foggy outside, clearing.
23	do.....	30.26	do.....	do.....	Clear.
25	do.....	30.03	Southwest...	3 miles...	Do.
26	Obscured.....	30.09	Northwest...	5 miles...	Dense fog.
27	do.....	30.14	North.....	4 miles...	Do.
28	Smooth.....	30.04	do.....	3 miles...	Clear.
29	Rough.....	29.90	Southeast....	25 miles...	Raining.
30	No report, line down.				
Oct. 2	Rough.....	30.38	do.....	6 miles...	Cloudy.
3	Smooth.....	30.28	North.....	do.....	Clear.
4	do.....	29.96	East.....	25 miles...	Do.
5	Moderate.....	30.10	Southeast....	18 miles...	Cloudy.
6	Obscured.....	30.32	do.....	2 miles...	Dense fog.
7	Moderate.....	30.34	East.....	14 miles...	Cloudy.

EXHIBIT F.—Statement showing the condition of the bar at the mouth of the Columbia River at 8 a. m., one hundred and twentieth meridian time, etc.—Continued.

Date.	Condition of bar.	Barom-eter.	Wind.	Force.	Weather.
1899.					
Oct. 9	Rough	30.20	North	12 miles...	Cloudy.
10	....do	29.76	West	4 miles...	Partly cloudy.
11	Moderate	29.68	Northeast	5 miles...	Clear.
12	Smooth	29.82	North	7 miles...	Cloudy.
13	....do	30.04	Northeast	5 miles...	Clear.
14	....do	30.14	Southeast	7 miles...	Cloudy.
16	Obscured	29.96	Northwest	6 miles...	Dense fog.
17	Smooth	30.12	West	12 miles...	Light rain.
18	....do	29.60	East	8 miles...	Clear.
19	No report, line down.				
20	No report, line down.				
21	Rough	29.76	Southeast	10 miles...	Cloudy.
23	Smooth	30.14	....do	16 miles...	Do.
24	Obscured	30.12	South	4 miles...	Light rain.
25	Smooth	30.34	East	15 miles...	Cloudy.
26	Moderate	30.24	Southeast	10 miles...	Light rain.
27	....do	30.10	....do	26 miles...	Light rain.
28	Smooth	29.86	East	4 miles...	Clear.
30	No report, line down.				
31	Smooth	30.24	East	20 miles...	Cloudy.
Nov. 1	....do	30.12	....do	20 miles...	Do.
2	No report, line down.				
3	Very rough	29.92	South .....	....do	Light rain.
4	Rough	30.02	Northwest	3 miles...	Clear.
6	Very rough	29.96	South	36 miles...	Cloudy.
7	Rough	30.02	....do	34 miles...	Light rain.
8	Moderate	29.82	Northeast	8 miles...	Cloudy.
9	....do	29.76	Southeast	42 miles...	Do.
10	Smooth	29.60	East	20 miles...	Light rain.
11	Rough	29.88	Southeast .....	....do	Cloudy.
14	Moderate	29.84	East	10 miles...	Do.
15	Rough	29.58	Southeast	20 miles...	Light rain.
16	....do	29.80	South	15 miles...	Do.
17	Smooth	30.06	East	10 miles...	Cloudy.
18	No report, line down.				
20	No report, line down.				
21	No report, line down.				
22	Very rough	29.84	South	23 miles...	Do.
23	Rough	29.82	East	25 miles...	Do.
24	....do	30.12	South	18 miles...	Do.
25	Very rough	29.86	East	23 miles...	Light rain.
27	Rough	29.76	South	23 miles...	Do.
28	....do	30.08	....do	5 miles...	Cloudy.
29	....do	29.02	West	34 miles...	Do.
Dec. 1	....do	30.08	East	5 miles...	Raining.
2	Moderate	30.34	....do	15 miles...	Clear.
4	....do	29.80	....do	28 miles...	Light rain.
5	Rough	30.16	West	12 miles...	Cloudy.
6	Very rough	30.02	Southwest	8 miles...	Do.
7	No report, line down.				
8	Rough	30.02	Southeast	5 miles...	Do.
9	....do	30.20	East	12 miles...	Do.
11	Very rough	29.88	West	18 miles...	Do.
12	Obscured	30.04	South	10 miles...	Light rain.
13	Smooth	30.20	East	5 miles...	Cloudy.
14	....do	29.86	....do	10 miles...	Do.
15	Moderate	29.36	....do .....	....do	Do.
16	No report.				
17	No reports received. Govern-ment line to Fort Canby dis-continued.				
1900.					
Feb. 7	No reports received. Govern-ment line to Fort Canby dis-continued.				
8	Moderate			Light	Raining.
9	Rough .....			....do	Cloudy.
10	....do .....			....do	Dense fog.
12	Moderate		Southeast .....	....do	Cloudy.
14	Smooth		North .....	....do	Partly cloudy.
15	....do		Northeast	Brisk	Light snow.
16	....do		East .....	....do	Sleet.
17	Moderate .....		....do .....	....do	Cloudy.
19	....do		Southeast .....	....do	Raining.
20	No report.				
21	No report.				
22	No report.				
23	Moderate		East	Light	Dense fog.
24	No report.				
26	Very rough		Northwest .....	....do	Cloudy.

EXHIBIT F.—Statement showing the condition of the bar at the mouth of the Columbia River at 8 a. m., one hundred and twentieth meridian time, etc.—Continued.

Date.	Condition of bar.	Barom-eter.	Wind.	Force.	Weather.
1900.					
Feb. 27	Moderate .....	.....	East	Light.....	Cloudy.
28	No report.	.....	.....	.....	.....
Mar. 1	Obscured .....	.....	.....do .....	.....do	Dense fog.
2	Rough .....	.....	.....do .....	.....do	Cloudy.
3	Moderate .....	.....	North	Brisk	Do.
6	.....do .....	.....	Southeast	Light	Do.
7-20	No reports.	.....	.....	.....	.....
21	Moderate .....	.....	East .....	.....do	Do.
22	Rough .....	.....	Northwest .....	.....do	Do.
24	Moderate .....	.....	Southeast .....	.....do	Do.
27	.....do .....	.....	East .....	.....do	Partly cloudy.
28	Smooth .....	.....	.....do .....	.....do	Clear.
29	Rough .....	.....	Southwest	Brisk	Cloudy.
30	Smooth .....	.....	Southeast	Light	Cloudy.
31	.....do .....	.....	South .....	.....do	Clear.
Apr. 2	Rough .....	.....	.....do	Brisk	Light rain.
3	.....do .....	.....	Southeast	Light	Cloudy.
4	No report.	.....	.....	.....	.....
5	Smooth .....	.....	South	Heavy	Light rain.
6	Rough .....	.....	Southeast .....	.....	Raining.
9	Moderate .....	.....	East	Light	Cloudy.
10	Smooth .....	.....	.....do	Brisk	Clear.
11	No report.	.....	.....	.....	.....
12	Moderate .....	.....	South	Light	Cloudy.
13	Smooth .....	.....	East .....	.....do	Light rain.
14	Moderate .....	.....	Northwest .....	.....do	Partly cloudy
16	Smooth .....	.....	.....	Calm	Clear.
17	.....do .....	.....	.....	.....do	Do.
18	.....do .....	.....	Northwest	Light	Cloudy.
19	Rough .....	.....	.....	Calm	Do.
20	Moderate .....	.....	North	Light	Clearing.
21	Smooth .....	.....	West .....	.....do	Cloudy.
23	.....do .....	.....	Northwest .....	.....do	Clear.
24	Rough .....	.....	West .....	.....do	Do.
25	.....do .....	.....	Northwest .....	.....do	Light rain.
26	.....do .....	.....	.....do	Brisk	Partly cloudy
28	Smooth .....	.....	.....	Calm	Light fog.
30	.....do .....	.....	Southwest	Light	Do.
May 1	.....do .....	.....	South .....	.....do	Cloudy.
2	.....do .....	.....	Northwest .....	.....do	Do.
3	Moderate .....	.....	.....	Calm	Do.
4	Smooth .....	.....	Southwest	Light	Do.
5	.....do .....	.....	South .....	.....do	Do.
7	Moderate .....	.....	Southwest	Brisk	Light rain.
8	Smooth .....	.....	Southeast	Light	Partly cloudy.
9	Moderate .....	.....	South .....	.....do	Cloudy.
11	Smooth .....	.....	Northwest .....	.....	Squalls, with rain.
12	.....do .....	.....	Southeast	Light	Cloudy.
14	Moderate .....	.....	East .....	.....do	Do.
15	.....do .....	.....	Southeast .....	.....do	Do.
16	.....do .....	.....	Northwest .....	.....do	Clear.
17	Smooth .....	.....	Northwest .....	.....do	Do.
18	Moderate .....	.....	West .....	.....do	Partly cloudy.
19	Rough .....	.....	Northwest .....	.....do	Do.
21	Smooth .....	.....	.....do .....	.....do	Clear.
22	.....do .....	.....	.....do .....	.....do	Partly cloudy.
23	.....do .....	.....	South	Brisk	Light rain.
24	Line down, no report.	.....	.....	.....	.....
25	Line down, no report.	.....	.....	.....	.....
26	Line down, no report.	.....	.....	.....	.....
27	Line down, no report.	.....	.....	.....	.....
28	Line down, no report.	.....	.....	.....	.....
29	Smooth .....	.....	East .....	.....do	Clear.
31	.....do .....	.....	West	Light	Clearing.
June 1	Moderate .....	.....	North .....	.....do	Clear.
2	No report, line down.	.....	.....	.....	.....
3	No report, line down.	.....	.....	.....	.....
5	Smooth .....	.....	West .....	.....do	Cloudy.
6	.....do .....	.....	Northwest .....	.....do	Clearing.
7	.....do .....	.....	East .....	.....do	Clear
8	No report.	.....	.....	.....	.....
9	Smooth .....	.....	Northwest .....	.....do	Do.
11	.....do .....	.....	.....do .....	.....do	Do.
12	.....do .....	.....	.....	Calm	Do.
13	.....do .....	.....	South	Light	Cloudy.
14	Line down.	.....	.....	.....	.....
15	Smooth .....	.....	.....do .....	.....do	Do.
16	Moderate .....	.....	.....do .....	.....do	Do.
18	Smooth .....	.....	Southeast .....	.....do	Light rain.
19	No reports received.	.....	.....	.....	.....
20	No reports received.	.....	.....	.....	.....

EXHIBIT F.—Statement showing the condition of the bar at the mouth of the Columbia River at 8 a. m., one hundred and twentieth meridian time, etc.—Continued.

Date.	Condition of bar.	Barometer.	Wind.	Force.	Weather.
1900.					
June 21	Obscured.....	.....	Northwest...	Light.....	Cloudy.
22	Moderate.....	.....	do.....	do.....	Clear.
23	Smooth.....	.....	do.....	do.....	Do.
25	Moderate.....	.....	Southeast.....	do.....	Light rain.
26	Rough.....	.....	do.....	do.....	Cloudy.
27	Smooth.....	.....	East.....	do.....	Clear.
28	Moderate.....	.....	South.....	do.....	Light fog.
29	Smooth.....	.....	Southeast.....	do.....	Cloudy.
30	Rough.....	.....	Northwest.....	Brisk.....	Do.
July 2	Smooth.....	.....	North.....	Light.....	Light rain.
3	Line down.	.....		
5	Smooth.....	.....	Northwest.....	do.....	Cloudy.
6	Moderate.....	.....		Calm.....	Clearing.
7	Smooth.....	.....	North.....	Light.....	Clear.
9	do.....	.....	Northwest.....	do.....	Do.
10	do.....	.....	do.....	do.....	Do.
11	do.....	.....	North.....	do.....	Do.
12	Moderate.....	.....	do.....	do.....	Do.
13	Smooth.....	.....	Northwest.....	do.....	Do.
14	do.....	.....	do.....	do.....	Hazy.
16	do.....	.....	do.....	do.....	Cloudy.

EXHIBIT G.

Number of days with gales.¹

[United States Department of Agriculture, Weather Bureau. Station, Fort Canby, Wash.]

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1891.....	11	5	9	6	1	4	0	2	5	7	14	18	82
1892.....	8	3	5	10	3	1	1	1	6	4	13	10	65
1893.....	6	13	16	11	5	4	0	0	3	6	15	9	88
1894.....	15	13	15	9	2	2	2	0	11	13	8	17	107
1895.....	12	7	8	11	7	1	1	1	3	1	7	19	78
1896.....	17	8	3	7	6	2	0	0	1	3	13	16	76
1897.....	11	8	10	3	2	2	1	3	2	5	11	17	75
1898.....	8	17	3	6	2	2	1	0	5	9	11	11	75

¹ Forty miles or over per hour.

EXHIBIT H.

Number of foggy days.¹

[United States Department of Agriculture, Weather Bureau. Station, Fort Canby, Wash.]

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1891.....	10	0	1	1	2	0	2	3	4	1	1	0	25
1893.....	8	6	1	0	3	0	1	9	7	4	3	10	52
1894.....	8	5	1	4	5	3	5	9	1	2	9	0	52
1895.....	5	8	4	0	3	6	5	13	3	14	8	4	73
1896.....	3	7	5	1	2	4	2	9	10	7	1	8	59
1897.....	8	5	4	2	3	2	1	15	6	2	2	1	51
1898.....	3	4	2	1	0	3	4	6	7	4	0	1	35

¹ Days on which fog surrounds station for one hour or more and is dense enough to obscure objects at a distance of 1,000 feet.

EXHIBIT J.

The following is a partial list of ships sailing from Portland during the last nine months of the fiscal year ending June 30, 1900. The draft of water is from records kept by the Merchants' Exchange.

Name.	Draft.	Name.	Draft.
	<i>Ft. in.</i>		<i>Ft. in.</i>
British steamer Queen Adelaide.....	22 0	British steamer Abergeldie	23 6
British steamer Monmouthshire.....	21 0	British steamer Monmouthshire	23 6
British steamer Abergeldie	23 3	British steamer Braemar	23 3
British steamer Arab	23 0	Norwegian steamer Thyra	23 8
British steamer Monmouthshire.....	23 0	British steamer Ness	23 10
British steamer St. Irene	23 0	Norwegian steamer Guernsey	23 0

Sailing vessels during same period (actual cargo loaded at Portland).

Name.	Draft.	Name.	Draft.
	<i>Ft. in.</i>		<i>Ft. in.</i>
British bark Royal Forth	23 1	British bark Ancyra	22 8
British bark Crown of Germany	22 6	British bark Samaritan	22 6
British ship Leyland Brothers	22 8	British bark Donna Francisco	22 9
British ship Glenholm	22 10	British ship Dovenby Hall	22 11
British ship Fulwood	22 8	British bark Inverness-shire	22 6
German bark Magdalene	23 2	British ship Allerton	22 1
British bark Crown of England.....	22 0	British bark Pinnmore	22 8
British bark Galena	22 0	German ship Mabel Rickmers	22 6
British ship Scottish Isles.....	22 5	British bark Galgate.....	22 4
British ship Craigmore.....	22 3	British bark Lydgate	22 11